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# *Indian Standard*

## DIMENSIONS OF TOROIDS MADE OF MAGNETIC OXIDES OR IRON POWDER

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MAGNETIC OXIDES OR IRON POWDER**

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## *Indian Standard*

# DIMENSIONS OF TOROIDS MADE OF MAGNETIC OXIDES OR IRON POWDER

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 13 January 1976, after the draft finalized by the Magnetic Components and Ferrite Materials Sectional Committee had been approved by the Electrotechnical Division Council.

**0.2** While preparing this standard, assistance has been derived from IEC Document 51 ( Central Office ) 157 ' Dimensions of toroids made of magnetic oxides or iron powder ', issued by the International Electrotechnical Commission.

**0.3** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS: 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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### 1. SCOPE

**1.1** This standard gives dimensions of toroids to serve as a guide for design of toroids ( ring cores ) of rectangular cross section made of magnetic oxides or iron powder, for pulse and broad band transformers.

### 2. PREFERRED VALUES

**2.1** For the outer diameter, the R5 series between 2.5 and 40 mm, as given below, should be considered as guidance:

2.5, 4, 6.3, 10, 16, 25 and 40 mm

NOTE — It should be recognized that an established practice may not easily be changed and also that the tooling costs for manufacturing toroids are relatively low when a long production run is involved.

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\*Rules for rounding off numerical values ( revised ).

### **3. TOLERANCE**

**3.1** The tolerance on both the inner and outer diameter and on the height is  $\pm 3$  percent or  $\pm 0.15$  mm, whichever is the greater.

**3.2** The calculated values shall be appropriately rounded off to the nearest 0.05 mm.

NOTE — Tightening of the height tolerance to  $\pm 0.1$  mm for cores with a diameter up to 6.3 mm may be required to obtain appropriate control of the inductance factor.

### **4. DIMENSIONAL RATIO**

**4.1** The ratio of inner diameter, outer diameter and height of the toroid may be optimized with respect to  $\frac{R_{dc}}{L}$  of the winding for constant total volume of the wound core.

Furthermore, the influence of secondary parameters such as the unavoidable rounding of edges, and the insulation on core and wire, is more important for small cores than for large ones.

**4.2** The following recommended ratios may be used when setting up series of preferred dimensions for ferrite toroids:

$$\text{Inner to outer diameter, } \frac{d_2}{d_1} = 0.6 \quad \left( \frac{d_1}{d_2} = 1.67 \right)$$

$$\text{Height to inner diameter, } \frac{h}{d_2} = 0.5$$

### **5. EDGES**

**5.1** Sharp edges shall be removed.

### **6. DERIVED STANDARDS**

**6.1** By way of example, a possible standard for ferrite toroids has been given in Appendix A.

## **A P P E N D I X A**

( Clause 6.1 )

### **EXAMPLE OF A POSSIBLE STANDARD FOR A SERIES OF FERRITE TOROIDS**

#### **A-1. STANDARD FOR A SERIES OF FERRITE TOROIDS**

**A-1.1** Table 1 read with Fig. 1 gives a complete example for the dimensions of a series of ferrite toroids in accordance with the basic information given in this standard.

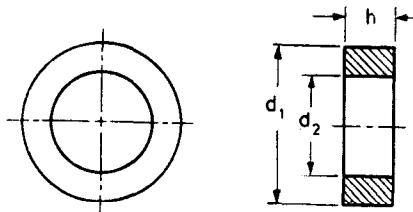


**TABLE 1 DIMENSIONS OF A SERIES OF FERRITE TOROIDS**

( Clause A-1.1 )

All dimensions in millimetres.

		NOMINAL SIZES						
		2.5	4	6.3	10	16	25	40
$d_1$	$\left\{ \begin{array}{l} Min \\ Nom \\ Max \end{array} \right.$	2.35 2.5 2.65	3.85 4.0 4.15	6.10 6.30 6.50	9.7 10 10.3	15.50 16 16.50	24.25 25 25.75	38.80 40 41.20
	$\left\{ \begin{array}{l} Min \\ Nom \\ Max \end{array} \right.$	1.35 1.5 1.65	2.25 2.4 2.55	3.65 3.8 3.95	5.80 6.0 6.20	9.30 9.6 9.90	14.55 15 15.45	23.30 24 24.70
	$\left\{ \begin{array}{l} Min \\ Nom \\ Max \end{array} \right.$	0.6 0.75 0.9	1.05 1.2 1.35	1.75 1.9 2.05	2.85 3.0 3.15	4.65 4.8 4.95	7.25 7.5 7.75	11.65 12 12.35

**FIG. 1 DIMENSIONS OF FERRITE TOROIDS**

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